

WHAT IS CLAIMED IS:

Mulc 7

1. An integrated circuit, comprising:
a semiconductor device;
a contact layer disposed outwardly from the semiconductor device and operable to provide electrical connection to the semiconductor device; and
a dielectric layer disposed inwardly from the contact layer and outwardly from the semiconductor device, the dielectric layer comprising an at least substantially porous dielectric material doped with at least one dopant.

2. The integrated circuit of Claim 1, wherein the dopant comprises at least one of phosphorus, fluorine, carbon, and boron.

3. The integrated circuit of Claim 1, wherein the at least substantially porous dielectric material comprises an at least substantially porous oxide.

4. The integrated circuit of Claim 1, wherein the semiconductor device comprises a transistor.

5. The integrated circuit of Claim 1, further comprising a nitride layer disposed between at least a portion of the semiconductor device and the dielectric layer.

6. A transistor, comprising:

a semiconductor substrate comprising a source region and a drain region;

5 a transistor gate disposed outwardly from the semiconductor substrate and between the source and drain regions;

a contact layer disposed outwardly from the semiconductor substrate and operable to provide electrical connection to the source and drain regions; and

10 a dielectric layer disposed inwardly from the contact layer and outwardly from the semiconductor substrate, the dielectric layer comprising an at least substantially porous dielectric material doped with at least one dopant.

15 7. The transistor of Claim 6, wherein the dopant comprises at least one of phosphorus, fluorine, carbon, and boron.

20 8. The transistor of Claim 6, wherein the at least substantially porous dielectric material comprises an at least substantially porous oxide.

25 9. The transistor of Claim 6, further comprising a gate dielectric disposed outwardly from the semiconductor substrate and inwardly from the transistor gate..

30 10. The transistor of Claim 6, further comprising a nitride layer disposed between at least a portion of the semiconductor substrate and the dielectric layer.

11. A method for forming an integrated circuit having an at least substantially doped porous dielectric, comprising:

5 forming a semiconductor device, the semiconductor device comprising at least a portion of a semiconductor substrate;

10 forming a dielectric layer disposed outwardly from the semiconductor substrate and surrounding at least a portion of the semiconductor device, the dielectric layer comprising an at least substantially porous dielectric material doped with at least one dopant; and

15 forming a contact layer disposed outwardly from the dielectric layer and operable to provide electrical connection to the semiconductor device.

12. The method of Claim 11, wherein the dopant comprises at least one of phosphorus, fluorine, carbon, and boron.

20 13. The method of Claim 11, wherein the at least substantially porous dielectric material comprises an at least substantially porous oxide.

25 14. The method of Claim 11, wherein forming a dielectric layer comprises:

forming an undoped at least substantially porous dielectric layer disposed outwardly from the semiconductor substrate and surrounding at least a portion of the semiconductor device; and

30 doping the dielectric layer with the at least one dopant.

20

15. The method of Claim 14, wherein doping the dielectric layer with the at least one dopant comprises:

5 forming at least one doping layer disposed outwardly from the dielectric layer, the at least one doping layer comprising the at least one dopant; and

annealing the at least one doping layer and the dielectric layer.

10 16. The method of Claim 14, wherein doping the dielectric layer comprises exposing the dielectric layer to at least one gas comprising the at least one dopant.

15 17. The method of Claim 11, wherein forming a dielectric layer comprises depositing a liquid precursor around at least a portion of the semiconductor device, the liquid precursor comprising the dielectric material and the at least one dopant.

20 18. The method of Claim 11, wherein forming a dielectric layer comprises forming the dielectric layer using at least one gas comprising constituents of the dielectric material and the at least one dopant.

25 19. The method of Claim 11, further comprising forming a nitride layer disposed between at least a portion of the semiconductor device and the dielectric layer.

P
A
T
E
N
T
A
P
P
L
I
C
A
T
I
O
N

21

20. The method of Claim 11, wherein forming a semiconductor device comprises:

forming a source region in the semiconductor substrate;

5 forming a drain region in the semiconductor substrate;
and

forming a transistor gate disposed outwardly from the semiconductor substrate and between the source region and the drain region.

10

Add B'